MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2018/2019

ERT2016 – ENGINEERING MECHANICS

(RE)

9 MARCH 2019
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This exam paper consists of only four printed pages, including this cover page.

2. Answer all questions.

3. Write all your answers in the answer booklet provided.

Question 1

a) Calculate the moment of the 400-N force about the point *O*. See Fig. 1a. [12 marks]

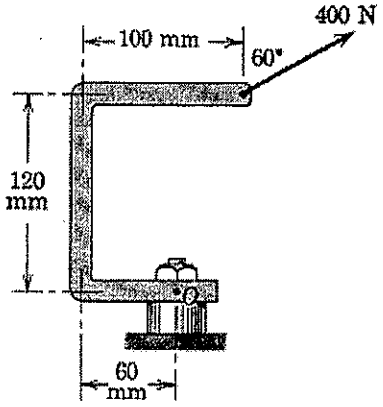

Figure 1a

b) Determine the *x*-coordinate of the centroid of the shaded region in Fig. 1b. [13 marks]

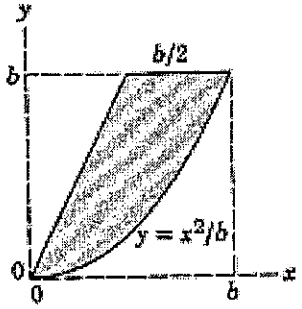

Figure 1b

Question 2

A uniform 60-kg bar *AB* is subjected to a force *P*. Assume smooth guides at *B*; and at *A*, the static friction coefficient is 0.8. See Fig. 2.

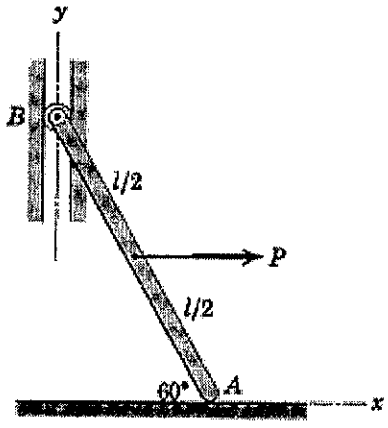

Figure 2

a) If $P = 400$ N, find the friction force at *A*. [12 marks]

b) Find the required *P* to cause slippage at *A*. [13 marks]

Continued . . .

Question 3

a) If $\theta = 1$ rad and $d\theta/dt = 1$ rad/s, what is the velocity of P relative to O? The distance OP is s. See Fig. 3a. [12 marks]

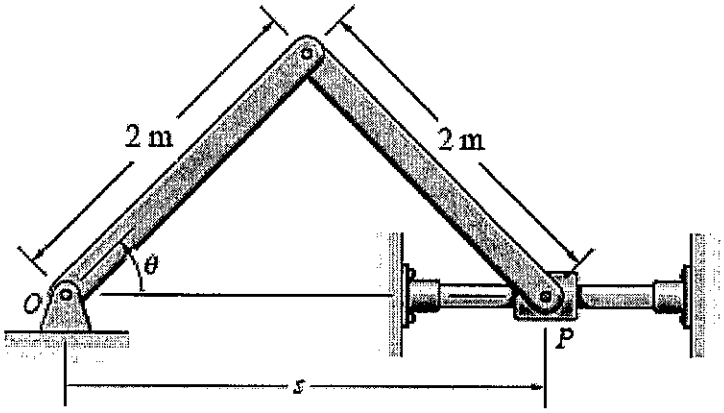

Figure 3a

b) The circular disk lies *in the horizontal plane* and rotates with a constant counterclockwise angular velocity of 4 rad/s. The 0.5-kg slider A is supported horizontally by the smooth slot and the string attached at B. Determine the tension in the string and the magnitude of the horizontal force exerted on the slider by the slot. See Fig. 3b. [13 marks]

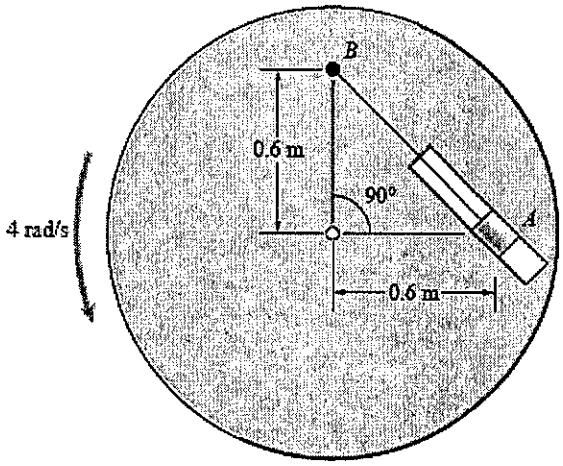

Figure 3b

Continued . . .

Question 4

a) If the bicycle's 120-mm sprocket wheel rotates through one revolution, through how many revolutions does the 45-mm gear turn? Also, if the angular velocity of the sprocket wheel is 1 rad/s, what is the angular velocity of the gear? See Fig. 4a. [12 marks]

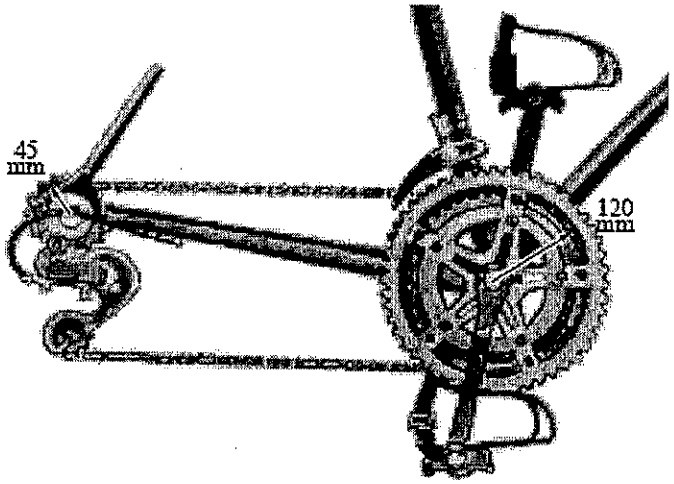

Figure 4a

b) Point *B* is moving to the right at 101.6 mm/s. Determine the velocity of point *A* and the angular velocity of the bar *AB*. See Fig. 4b. [13 marks]

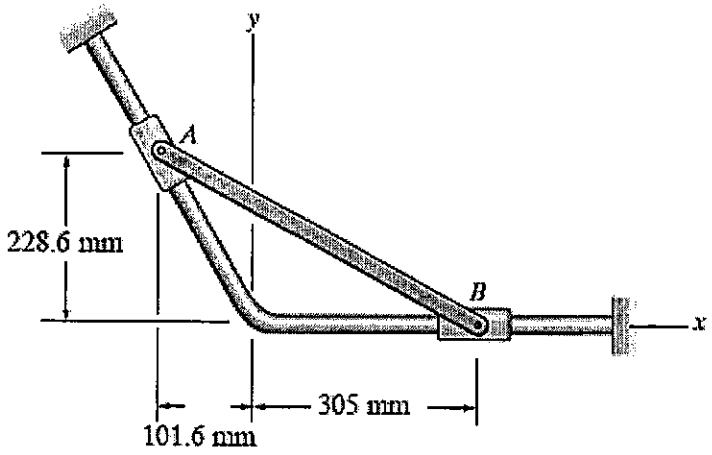

Figure 4b

End of Paper